collected during the whole of the cruise, till at last the voyage ends at Spithead, on May 24, 1876. From the start on December 7th, 1872, till that date the vessel had traversed 68,890 nautical miles, and at intervals as nearly uniform as possible had established 362 observing stations.

The final chapter gives a summary of the results obtained by the officers of the Expedition, and by experts subsequently employed in the investigation of the density of sea-water, the composition of the salts of the ocean, the geographical and bathymetrical distribution of specific gravity, the carbonic acid, nitrogen, and oxygen present in sea-water, and a discussion of meteorological observations in their bearing upon oceanic circulation.

In this notice we have endeavoured merely to convey to the general reader some notion of the contents of the two portly volumes which contain the official narrative of the most important scientific expedition which has ever been despatched by any Government for the investigation of the depths of the ocean. The materials are not yet ready for a complete digest of the whole work achieved. But it would have been an important addition to the value of the Narrative had the authors endeavoured to give such a digest as far as the materials are now in their hands, marking those portions regarding which the final reports had not been received. Such a summary, carefully arranged in subjects and with precise references to the detailed Reports for fuller information, would have been of great service to those who cannot follow all the technical details of the Reports, as well as to the specialists who wish to learn to what source they have to turn for their own requirements. Let us hope that in a future edition of the narrative this want will be supplied. Meanwhile no one can rise from the perusal of these volumes without an admiration for the solid, painstaking, and conscientious way in which their compilation has been accomplished. They are not light reading, but they abound in material of general interest and form a fitting record of the great Expedition which they chronicle.

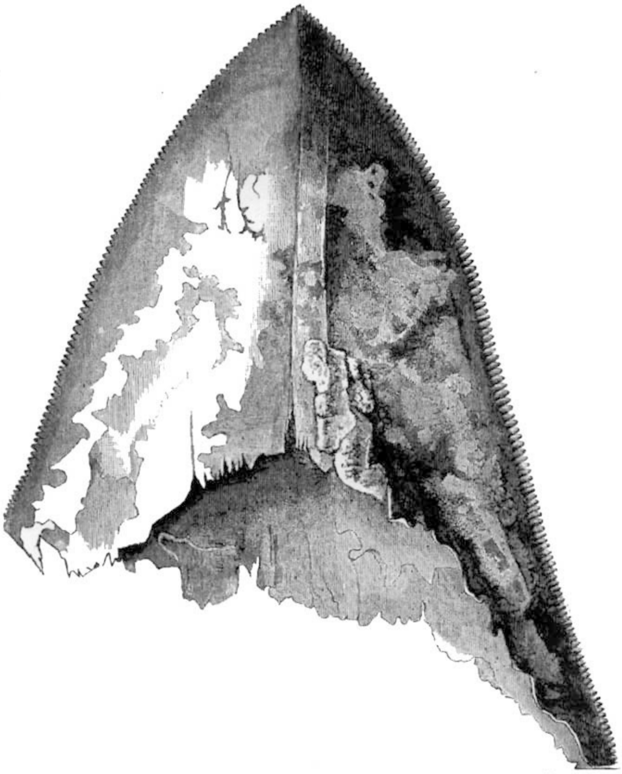

FIG. 7.—Tooth of a Shark (*Carcharodon megalodon*) from a depth of 2385 fms.

NOTES

THE fourteenth meeting of the French Association will take place on August 12 at Grenoble. M. Verneuil, Member of the Academy of Medicine, will be President. The public lectures will be "On the New Gallery of Palæontology of the Paris Museum," by M. Cotteau, ex-chairman of the Geological Society of France, and by M. Rochard, General Inspector of the Marine, on "The Victualling of France." A large number of medical questions will be dealt with in the several sections of the congress. The Ferran cholera experiments are sure to be discussed at full length. Numerous excursions will take place in the Alps under competent guidance as far as Chambery.

IN the course of the present summer the *Geological Magazine* will be twenty-one years old. During that period Dr. H. Woodward has been one of its editors, and for almost the whole time the principal editor, on whom the burden of the work has fallen. Further, the arrangement made with the publishers, in order to secure the continuance of the *Magazine*, would have actually resulted in pecuniary loss, but for illustrations presented by authors. Of the ability with which the *Magazine* has been conducted, and of its value to geologists, there can be no question. A committee has been formed, with Prof. Bonney as chairman, to give expression to their sense of the services which he has rendered to geology by presenting him with a testimonial, of which a piece of plate will, at any rate, form a part. The secretary and treasurer of the committee is Mr. G. J. Hinde, 11, Glebe Villas, Mitcham, Surrey, to whom subscriptions may be paid, or to the "Woodward Testimonial Fund," at the London and Westminster Bank, Limited.

ELABORATE preparations have been made in the neighbourhood of Niagara Falls for the formal transfer to-day to the Government of New York State of the strip of land adjoining the Falls on the American side. This strip will be thrown open for the future, free to the public, as "The Niagara International Park." Officials and troops representing both New York State and Canada will attend the ceremonies. This transfer attracts much attention, as it renders America's great cataract free henceforth to the world. We have already alluded at some length to the acquisition of the Falls and immediate neighbourhood by the State

THE annual meeting of the Royal Archæological Institute will be held at Derby from Tuesday, July 28, to Wednesday, August 5, inclusive. The presidents of the three sections will be:—Antiquarian, the Rev. J. C. Cox, LL.D.; Historical, the Dean of Lichfield; Architectural, the Right Hon. A. J. Beresford-Hope.

THE observations made at the Ben Nevis Observatory have been received to the end of June. During the twelve months ending with June the rainfall, snow, and hail have been measured with all possible care every hour. During the year the whole of the rainfall, inclusive of melted snow and hail, amounts to 152·15 inches. Averaging the monthly falls from June, 1881, the mean annual rainfall on the top of Ben Nevis is 145·73 inches, which is thus the largest mean annual rainfall of any place at which rain has been observed in Scotland. The largest rainfall in any single month was 25·30 inches in December, 1884, and the smallest 4·85 inches in April, 1885. Falls of an inch a day, or upwards, are of comparatively frequent occurrence, having been recorded during one day in seven out of the 365 days. On two of the days upwards of four inches of rain was measured at the Observatory.

A TELEGRAM from Cooktown to Berlin, July 8, announces the arrival there of the New Guinea Company's steamship *Samoa*, with Dr. Finsch on board, who is returning to Europe from his recent exploring expedition along the unknown portions of the coast of Kaiser Wilhelm's Land (New Guinea) which are situated between Astrolabe Bay and Humboldt Bay. Dr. Finsch reports the discovery of several good harbours and of a navigable river. The land is suitable both for agriculture and stock-raising. The natives were friendly.

THE Comptroller-General of patents, designs, and trade marks has issued, in the form of a Parliamentary paper, his report, the second since the passing of the Act of 1883. That the new Act has worked well in the interest of inventors may be seen from the fact that the number of applications for patents, which had risen, with some variations, almost constantly in the course of thirty years, from 1211 in the year 1852, to 6241 in 1882, leaped with a bound to 17,110 in 1884. The increase is, in fact, as between the years 1883 and 1884, no less than 195 per cent. Seventy-nine per cent. of the applications were made by persons resident in the United Kingdom—namely, 12,356 being residents in England and Wales, 901 in Scotland, and 254 in Ireland. Of the rest the largest numbers were from the United States, 1181, from Germany 890, and from France 788. Residents from twenty-seven other countries also made application to the office, thirteen such countries being British possessions, from which 175 applications were made, and three, it may be added, were made from Egypt. Only three appeals were made in the course of the year against the decision of the Comptroller, so that it may be taken that his decision is almost invariably satisfactory to applicants. The receipts of this office amounted to 103,827*l.*, of which 88,996*l.* were for patents' fees, 3477*l.* for designs' fees and stamps, 7014*l.* for trade-marks' fees, and more than 4000*l.* for the sale of publications. The chief payments made were 36,225*l.* for salaries—all of which are set forth in detail in the report—and 17,000*l.* to Messrs. Eyre and Spottiswoode for printing. There was a surplus income of nearly 40,000*l.*

THE International Telegraph Congress, which meets in Berlin on August 10, will be attended by delegates from all the European states, and from Brazil, British India, Dutch India, Egypt, Algeria, Cochin China, Japan, Natal, New Zealand, Persia, Siam, Cape Colony, South Australia, and Victoria, as well as from all the great cable companies. The chief subjects of deliberation will consist of various technical questions, including more especially a general reduction of tariffs.

THE Council of University College, London, have instituted a Professorship of Electrical Engineering, and have appointed Dr. J. A. Fleming thereto. Dr. Fleming retains his connection as advising electrician with the Edison and Swan Electric Light Company.

WE give the following extracts from Prof. Adams's report to the Senate as to the proceedings in the Cambridge Observatory for the year ending May 26, 1885:—The total number of observations made with the transit circle during this interval, for determinations of right ascension and north polar distance, is 3253. These include 658 observations of clock stars made on 152 nights; 69 observations of Polaris at the upper transit involving 151 circle readings, and 73 observations at the lower transit involving 180 circle readings; 11 observations of stars compared with Wells's Comet; and 2442 observations of zone stars made on 100 nights, the greater number at five or seven wires, and all, without exception, read off with four microscopes. For instrumental adjustment the Nadir Point was observed 203 times, the level 203 times, and the collimation 207 times. Twenty pairs of observations for flexure of the transit telescope made June 18 to 23, 1884, give for the coefficient −0″·651; this will need confirmation, as it differs considerably from the former determination, −0″·936. The observations of clock stars and those of Polaris are completely reduced, and the mean places for January 1 obtained up to the end of 1884. The true apparent places of all the other stars observed in 1884 is also obtained both in Right Ascension and North Polar Distance. As regards the observations of former years:—The mean R.A. and N.P.D. of the Zone Stars are obtained up to December 12, 1877, and the true apparent R.A. and N.P.D. to the end of 1882, and the reductions are far advanced in 1883. The reductions from mean to apparent place at date are calculated to the end of 1882. The means of transits and microscope readings are deduced up to the present time. The intervals of R.A. wires used in the reductions for 1884 were obtained from 63 observations of Polaris made January 18 to July 10, 1884: (1), by taking the mean of the intervals for Polaris and the mean of the declinations, and using the formula $\sin E = \sin P \cos \delta$; (2) by deducing the equatorial intervals from each individual observation, and taking the mean of the results. The intervals by the two methods almost exactly agreed. The meteorological observations are communicated daily by telegraph to the Meteorological Office. The sunshine recorder has been regularly employed, and the records sent at intervals to the office.

COL. PRJEVALSKY telegraphed to St. Petersburg from Kiria, in Khotan, on June 20, that during April and May he and his party had explored the region between Lob Nor and Kiria, and that, leaving stores at the latter place, he was about to go into the neighbouring Tibetan mountains, whence he would return to Kiria at the end of August, and then come back to Russia.

PROF. THALÉN, whose classical researches on the spectra of the metallic elements have won for him such wide renown, has recently published a new memoir on, and a revised list of, the lines of iron, presented to the Royal Society of Upsala last September (published by Berling, Upsala). The new work has been done by means of a gramme dynamo, and much higher dispersion than that employed in 1864. An upper carbon pole being rejected on account of the spectrum of "acetylene," about which we have heard so much in this country, and which we now know to be due to carbon vapour, three tubes of iron 15 mm. in external diameter were used to prevent fusion of the points. The size of the laboratory did not permit the use of a lens, but the poles were placed in a horizontal position. The spectroscope employed had six and sometimes nine prisms of flint of 60°, the focal length of the object-glasses of collimator and telescope being 81 cm. and magnifying power 62. The wave-lengths have also been re-determined by a process which he gives.

Bulletin No. 8 (1885) of the U.S. Department of Agriculture (Division of Entomology) is occupied by a particularly interesting memoir by Prof. C. V. Riley on the occurrence of "Periodical Cicada" (*C. septendecim*). This insect is one of the marvels of entomology, because ordinarily a period of seventeen years elapses between the deposition of the egg and the appearance of the perfect *Cicada*, and practically all but a few weeks of that period are passed in the preparatory underground larval condition. But even such a Methusaleh amongst insects is liable to have its development hastened (and its whole life thereby shortened) by temperature, for Prof. Riley discovered that (principally in the Southern States) there is also a thirteen-year brood of the same species, although each condition impinges on the domain of the other. That the larva sometimes penetrates to a great depth is shown by the fact that the perfect insects, true to time, once came through the floor of a cellar 5 feet deep, a building having been erected over the site of their underground quarters; in another instance the larvæ were found 10 feet below the surface.

Occasionally, at very long intervals, the 17-year and 13-year forms appear simultaneously. Such an event as regards one of the largest broods happened in the year 1647, again in 1868, and will not again occur till 2089. But it must not be supposed that the broods are simultaneous over all the United States; they vary according to locality, so that somewhere or other there is nearly always a brood on the wing. Prof. Riley has, through his agents, collected information from many states, and for thirty-two different districts is able to predict the particular year of appearance during the next 13 and 17 respectively in these districts. 1887, 1890, and 1892 are the only years omitted as not likely to produce the Cicadas. One would imagine that in the course of 17 years a larval *Cicada* must occasion great damage to the roots of trees, &c., but it would seem that any damage in this way is as nothing compared with that inflicted on the foliage by the perfect insect during its brief existence.

An air-balloon railway is about to be constructed on the Gaisberg, near Salzburg, a mountain of no great height, but offering a magnificent view over the beautiful neighbourhood of the town. The balloon, which will have grooved wheels on one side of its car, will ascend a perpendicular line of rails, constructed on the principle of the wire-rope railway invented years ago for the Righi, but never realised.

M. Fouqué has established at Meudon Observatory, with the kind assistance of M. Janssen, an apparatus for registering electrically the propagation of earthquakes in underground layers. Experiments have been made by the fall of a weight of 600 kilogrammes from 7 metres; the results having been deemed satisfactory, measures are being taken for procuring the fall of 900 kilogrammes from 9 metres, which represents a shock of 81,000 kilogrammes. A steam elevator will be procured for further investigations.

At the recent distribution of prizes at University College, Dundee, Prof. Gairdner, of Glasgow, strongly advocated the formation of a School of Medicine in Dundee. Dr. Gairdner not only urged the duty of setting a medical school afoot, but he showed how in some ways a new school may be made more attractive and more efficient than the old, so as both to supply the educational needs of its own neighbourhood and even to draw students from a distance also. Tradition, prejudice, and the vested interests of professors make all reform slow in the old Universities, and cause many changes which are admittedly desirable to seem well-nigh impossible of attainment. The matter in which Prof. Gairdner chiefly indicated the possibility of reform is the present separation of practical from theoretical instruction and the long delay in bringing a student face to face at the bedside with disease. In a new school, he thought, the attempt should be made to give men hospital instruction from the very beginning of their student life; to illustrate to them in the wards what they are at the same time learning in the lecture-room in chemistry, anatomy, and physiology; and to give the longest possible training to hand and eye and ear in the subtle discrimination of disease.

The University College of Wales at Aberystwith was the scene of a destructive fire during Wednesday night last week, which resulted in the loss of two lives, including Prof. James Macpherson, and serious injury to three other persons. The College buildings were the largest and handsomest in the Principality, having been built at a cost of 80,000*l.*, and they include the necessary rooms and offices for the education of a large number of students. The flames spread with alarming rapidity, and in a short time had complete hold of the museum, library, professors' rooms, and students' apartments. By great exertions all the articles of value in the museum and library were removed. The Principal's residence and examination hall escaped, but the northern wing was gutted. The College was insured for 10,000*l.*, but the damage will amount to 40,000*l.*

A telegram from Simla, July 9, states that shocks of earthquake continue to be felt in Cashmere at intervals of two or three days. A severe shock occurred at Srinagar on the 4th inst.

A severe earthquake, which lasted for some time, and was felt, with varying intensity, over the whole province, occurred at Calcutta on Tuesday morning, at twenty-three minutes past six. Some of the shocks were very serious, and the walls of a number of houses were cracked, causing the utmost alarm to the inhabitants.

The death is announced, at the age of forty-seven years, of Mr. N. W. Posthumus, director of the Higher Burgher School at Amsterdam, one of the founders of the Dutch Geographical Society, and from the beginning its secretary and one of the editors of its *Journal*. Many contributions to the "Tijdschrift Aardrijkskundig-genootschap" are due to him.

We have received from the Observatory of Brussels the volumes of the *Annales* of the Royal Observatory there, giving the documents and observations made on the Transit of Venus in 1882 by the Belgian party ordered to Texas. Drawings are given of the contacts, which require careful study; almost everything but the "black dip" was seen in a Dolland of 11 cm. aperture.

The American Government have forwarded a consignment of catfish to the National Fish Culture Association with a view to their being acclimatised to the waters of this country. They arrived per s.s. *Britannic* in perfect condition, all being alive, which, considering the long voyage they had been subjected to, is remarkable. The catfish is a very valuable food-fish, and would assume a high rank amongst the freshwater fishes of our waters if cultivated. Pending their removal to the Fish Culture Establishment of the Association at Delaford, they are being exhibited at the Aquarium of the Inventions Exhibition, where they attract considerable attention.

Several of the picked dogfish in the tanks of the Aquarium at the Inventions Exhibition brought forth young last week. They lived for several days, but ultimately died.

A further stock of landlocked salmon were turned into the Thames on Thursday last by the Thames Angling Preservation Society, in the presence of various gentlemen interested in the matter. This species is exactly suited to this river, being non-migratory, for salmon once quitting for the sea the polluted water of the Thames are not likely to return thereto.

We have received a new edition of Mrs. Lankester's "Wild Flowers Worth Notice," revised, improved, and increased in size. Allen and Co. are the publishers.

"Face and Foot Deformities" is the title of a book of curious interest, by Mr. Frederick Churchill, C.M., published by J. and A. Churchill.

Those interested in glaciology should read Prof. Forel's little *brochure* on "Les Variations Périodiques des Glaciers des Alpes," separately reprinted from the *Jahrbuch* of the Swiss Alpine Club (Staempli, Berne).

Dr. J. E. Taylor's latest contribution to popular science is "Our Common British Fossils and where to find them" (Chatto and Windus). A prettily illustrated book of a similar character is Mr. F. G. Heath's "Where to find Ferns," published by the S.P.C.K.

The additions to the Zoological Society's Gardens during the past week include a Vervet Monkey (*Cercopithecus lalandii* ♂)

from South Africa, presented by Mr. G. C. Barnes; an American Badger (*Taxidea americana* ♀) from North America, presented by Mr. F. J. Thompson; a Common Fox (*Canis vulpes* ♀), British, presented by Mr. Christopher Heseltine; a Rufous Rat-Kangaroo (*Hypsiprymnus rufescens* ♀) from New South Wales, presented by Miss Laidlaw; a Red-throated Amazon (*Chrysotis collaria*) from Jamaica, presented by Mrs. S. Waite; three Rufous-vented Guans (*Penelope cristata*) from Central America, presented by Mr. G. H. Hawtayne, C.M.Z.S.; a Leopard Tortoise (*Testudo pardalis*) from South Africa, presented by Mrs. Henrietta Hodges; two Crowned Horned Lizards (*Phrynosoma coronatum*) from North America, presented by Master Chas. E. Napier; a Cinereous Vulture (*Vultur monachus*), European, a Nonpareil Finch (*Cyanospiza ciris*) from North America, deposited; an Axis Deer (*Cervus axis* ♂), a Mule Deer (*Cariacus macrotis* ♂), three Long-fronted Gerbilles (*Gerbillus longifrons*), seven Mandarin Ducks (*Œx galericulata*), four Chilian Pintails (*Dafila spinicauda*), bred in the Gardens.

ASTRONOMICAL PHENOMENA FOR THE WEEK, 1885, JULY 19–25

(For the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on July 19

Sun rises, 4h. 7m.; souths, 12h. 6m. 1·2s.; sets, 20h. 5m.; decl. on meridian, 20° 47′ N.: Sidereal Time at Sunset, 15h. 56m.

Moon (at First Quarter) rises, 13h. 10m.; souths, 18h. 28m.; sets, 23h. 38m.; decl. on meridian, 10° 33′ S.

Planet	Rises		Souths		Sets		Decl. on meridian
	h. m.		h. m.		h. m.		° ′
Mercury ...	6 3	...	13 34	...	21 7	...	16 27 N.
Venus ...	5 56	...	13 31	...	21 6	...	17 6 N.
Mars ...	1 18	...	9 33	...	17 48	...	23 23 N.
Jupiter ...	7 44	...	14 41	...	21 38	...	10 23 N.
Saturn ...	2 8	...	10 18	...	18 28	...	22 32 N.

Occultations of Stars by the Moon

July	Star	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image
			h. m.	h. m.	° °
20 ...	o^2 Libræ ...	... 6	... 22 58 ...	0 1* ...	136 272
22 ...	29 Ophiuchi	... 6	... 22 31 ...	23 1 ...	33 356

* Occurs on the following day.

Phenomena of Jupiter's Satellites

July	h. m.		July	h. m.	
20	... 21 21	III. tr. egr.	22	... 21 4	II. tr. egr.
22	... 20 55	I. tr. ing.	23	... 21 9	I. ecl. reap.

The Occultations of Stars and Phenomena of Jupiter's Satellites are such as are visible at Greenwich.

A TEACHING UNIVERSITY FOR LONDON

AN extraordinary meeting of the Convocation of London University will be held on the 28th inst., when the report of the Special Committee appointed on February 24 to consider the question of a Teaching University for London will be presented by Lord Justice Fry, who will also move the following resolutions:—

1. That the report of the Special Committee and the scheme therein comprised be received and adopted.

2. That the Senate be requested to consider and approve the said scheme, and to take such steps as they may think fit to carry the same into effect.

3. That a Committee of this house, consisting of five members, be appointed to confer with the Senate in respect of the said scheme in case the Senate shall desire such conference.

The following is the scheme for the constitution of the University proposed by the Special Committee:—

1. The University to consist of—(1) Senate; (2) Convocation; (3) Constituent Colleges; (4) Faculties; (5) Boards of Studies, with the Queen as Visitor.

I.—SENATE

2. To consist of:—(1) Chancellor; and (2) Vice-Chancellor (to be appointed and retain office as at present); (3) the Chairman of Convocation *ex officio;* (4) and not more than thirty ordinary members (including the Vice-Chancellor), of whom six shall be nominated by the Crown, six shall be elected by Convocation, and three shall be elected by each of the four Faculties. And if and when the following bodies respectively shall become Constituent Colleges—one shall be nominated by the President of University College, London; one shall be nominated by the Principal of King's College, London; one shall be nominated by the President of the Royal College of Physicians of London; one shall be nominated by the President of the Royal College of Surgeons of England; one shall be nominated by the Chairman of the Council of Legal Education, and one shall be nominated by the President of the Incorporated Law Society.

3. The nominating bodies to determine for themselves on what recommendation the nominations shall be made.

4. One-third of each of the groups of six and three members of the Senate to retire each year; such one-third to be those who have been longest in office, or, when several have been in office for the same period, to be ascertained by ballot.

5. The six representatives of colleges to serve for three years.

6. Power to fill up occasional vacancies.

7. Power to re-nominate and re-elect.

8. In the first place, the faculty and college members to be added to the existing Senate; but no new members to be appointed by the Crown or Convocation till the number of Crown and Convocation members respectively has fallen below six, and then only so as to bring the number up to six.

II.—CONVOCATION

9. To remain unchanged.

III.—CONSTITUENT COLLEGES

10. The Constituent Colleges to consist of the following bodies in or near London:—(*a*) such bodies as may be named in a schedule to be settled by a joint committee of the Senate and Convocation; (*b*) such other bodies being colleges or institutions incorporated by Royal Charter, or otherwise established on a permanent and efficient footing, in which the majority of the students are of the age of seventeen years at least, as the Senate with the concurrence of the faculty or faculties interested may from time to time admit.

11. Admission as a constituent college shall be subject to such terms as may be agreed upon between the body becoming a constituent college and the joint committee or the Senate with the concurrence aforesaid (as the case may be).

12. The constituent colleges shall be arranged in three groups —viz. (*a*), those colleges which are principally intended to occupy the entire time of their students; (*b*) those colleges in which lectures are given of the most advanced kind, whether professional, literary, or scientific; (*c*) those colleges which are intended to aid the evening studies of persons engaged in business, or otherwise do not fall under either of the preceding groups.

13. By the terms of agreement on the admission of such constituent college the following points shall be determined:—(*a*) The group to which it shall belong; (*b*) the faculty or faculties to which it shall belong; (*c*) the number of members of the faculties to represent the college; (*d*) the class or classes of professors or teachers in the college who are to take part in the election of members to represent the college.

14. In a college of the first and second group the number of its representatives on the faculties shall *prima facie* bear a larger proportion to the total number of professors and teachers in the college than in the case of a college in the third group.

15. A constituent college and the Senate with the concurrence of the faculty or faculties interested may revise the terms of the agreement between the University and the constituent college.

16. No person shall be eligible as a member of a faculty representing a college unless he be in the class of professors or teachers in that college and capable of taking part in the election of members to represent that college.

17. Power to be given to the Senate with the concurrence of the faculty or faculties interested—(*a*) to diminish or increase the number of teachers in a college who shall be members of a faculty or faculties; (*b*) for good cause to remove any college from being a constituent college.

18. The affiliation of colleges to the University to cease.